

Patent claims

1. A premix burner, suitable for forming at least one stable flame front in a combustion chamber,
5 comprising means for supplying fuel and air to said premix burner, and means for mixing fuel and air to form a fuel/air mixture for subsequent combustion in the combustion chamber, said burner comprising
 - 10 - a premix burner casing, having an upstream end and a downstream end thus defining a flow direction, said burner casing having the form of a tube which is open at the upstream end and being in fluid communication with the combustion chamber at its downstream end via a transition contour, for
15 flowing air therethrough;
 - a burner lance being formed as an inner tube, and projection into the interior of the premix burner casing on the premix burner casing upstream end, thus forming an annular flow duct with the burner
20 casing, the burner lance having: an upstream end, a downstream end, and an inner tube wall, forming an inner flow passage enclosed by said tube wall; at least one first fuel supply unit being provided on the inner tube wall to supply fuel into the inner
25 flow passage, and at least one second fuel supply unit being provided on the outer wall of the burner lance to supply fuel into the annular flow duct.
2. The premix burner as claimed in claim 1, the inner
30 tube being open at the upstream and downstream ends.
3. The premix burner as claimed in claim 1, the transition contour having an axial extend, and the downstream end of the inner tube being located in
35 the axial extend transition contour.

4. The premix burner as claimed in claim 1, the transition contour being convergent-divergent in the flow direction, thus, in a first section, narrowing the clear cross section of the premix burner casing and then widening the clear cross section towards the downstream end.
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5. The premix burner as claimed in claim 1, the burner lance being provided to be fitted into the premix burner casing in a modular manner.
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6. The premix burner as claimed in claim 1, a swirler being provided on the outer wall of the inner tube for introducing a swirl motion into a flow through the annular duct.
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7. The premix burner as claimed in claim 1, a swirler being provided on the inner wall of the inner tube for introducing a swirl motion into a flow through the inner flow passage.
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8. The premix burner as claimed in claim 1, wherein the fuel supply units are suitable for feeding either gaseous fuel or liquid fuel both into the inner flow passage and into the annular flow duct.
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9. The premix burner as claimed in claim 1, having at least one second fuel supply unit adapted to supply gaseous fuel to the annular flow passage, and at least one further fuel supply unit which is adapted to supply liquid fuel to the annular flow passage is provided on the inner tube downstream of the second fuel supply unit.
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10. The premix burner as claimed in claim 1, wherein at least one fuel supply unit is provided on the
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downstream side of the inner tube, said fuel supply unit being arranged and adapted to supply liquid fuel into a mixing zone which is defined by the transition contour.

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11. The premix burner as claimed in claim 1, at least two fuel supply units being arranged axially offset to one another, and being arranged to supply fuel to one selected of the annular flow duct or the inner flow passage.

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12. The premix burner as claimed in claim 1, the inner tube wall being formed such that the inner flow passage has an essentially constant flow cross section along the axial extend of the burner lance.

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13. The premix burner as claimed in claim 12, a fuel supply unit for feeding gaseous fuel into the inner flow passage and operable as a pilot gas supply is arranged essentially on the downstream end of the burner lance.

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14. The premix burner as claimed in claim 12, a fuel supply unit for feeding gaseous fuel into the inner flow passage and operable as a premix gas supply is provided upstream of the downstream end of the burner lance and is used as.

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15. The premix burner as claimed in claim 1, the inner wall of the inner tube being contoured such that the inner flow passage has an essentially constant flow cross section, with a divergent downstream end section, and a swirl generator is provided in the inner flow passage upstream of the divergent section.

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16. The premix burner as claimed in claim 15, least one fuel-addition unit (10) for feeding gaseous fuel into the inner flow passage (7) is provided immediately upstream the divergent section on the inner tube wall, thus causing a first flame front to stabilize within the divergent section of the inner flow channel, and a second flame front to stabilize downstream of the inner tube.
17. The premix burner as claimed in claim 1, one selected of the group of the casing inner contour, the inner tube outer contour, the inner tube inner contour, or any combination thereof being formed to provide a divergent-convergent venturi flow cross section of the inner flow passage, the annular flow duct, or both at the location of a fuel supply unit.
18. A method for firing a combustion chamber for driving a gas turbine using the modular premix burner as claimed in claim 1, comprising the steps of
generating a premixed air/fuel mixture vortex flow in the annular passage, said vortex flow forming a stable premixed flame front within the combustion chamber after having passed the transition contour;
supplying gaseous fuel into the inner flow passage essentially at the downstream end of the burner lance;
using said gaseous fuel as pilot gas; and
burning said pilot gas in a diffusion flame.
19. A method for firing a combustion chamber for driving a gas turbine using the modular premix burner as claimed in claim 1, comprising the steps of
generating a premixed air/fuel mixture vortex flow in the annular passage, said vortex flow forming a

- stable premixed flame front within the combustion chamber after having passed the transition contour; providing a divergent end section of the inner flow channel at the downstream end of the burner lance;
- 5 supplying gaseous fuel into the inner flow passage essentially at the downstream end of the burner lance such that a further flame front is formed axially upstream of the premixed flame front.
- 10 20. The premix burner as claimed in claim 2, further comprising means being arranged to flow air through the inner tube.
- 15 21. A method for firing a combustion chamber for driving a gas turbine using the modular premix burner as claimed in claim 1, comprising the steps of generating a premixed air/fuel mixture vortex flow in the annular passage, said vortex flow forming a stable premixed flame front within the combustion
- 20 chamber after having passed the transition contour; supplying gaseous fuel into the inner flow passage essentially upstream the downstream end of the burner lance;
- 25 using said gaseous fuel as premix gas; and mixing said premix gas with air flowing through the inner flow passage.
- 30 22. The use of the premix burner as claimed in claim 1 as a modular premix burner by providing a premix burner casing as a standard module and providing different burner lances, said burner lances being provided with different fuel supply units and/or swirl generators and can be integrated in modular fashion into the premix burner casing.